



## **DATA VALIDATION REPORT DUWAMISH RIVER SEDIMENT STUDY**

**Prepared for:**

**Damage Assessment Center  
National Oceanic and Atmospheric Administration  
Silver Spring, MD  
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**Under Subcontract to:**

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**July 16, 1998**

The specific technical items assessed for each laboratory report, and data qualifications are summarized in the following two sections.

## **II. DATA REVIEW OF PCB AND PCT RESULTS**

Results from the analysis of 328 sediment samples were reviewed by EcoChem, Inc. The data summaries with related quality control results were provided by the ECD/National Marine Fisheries Services (NMFS) Laboratory, Seattle, Washington.

### **COMPLETENESS**

The laboratory followed the QAP requirements for QC sample frequency of analysis, acceptance criteria, and corrective action processes. All anomalies were discussed in the case narrative or in footnotes to the data. No data were rejected based on the validation process.

### **CUSTODY**

All samples were listed on the chain of custody (COC) forms. Twenty-four samples were listed on the COC, but were not analyzed. As documented in a memorandum (EcoChem, December 1997), these samples were associated with stations that did not meet sampling design criteria. Additional samples were collected on November 12, 1997 and November 13, 1997, and identified with an "R" at the end of the field sample ID.

For samples collected on September 19, 1997, the COC relinquish date (indicating transfer from sampler to the freezer) was incorrectly recorded as June 19, 1997. Custody was judged not to be compromised and no action was necessary.

A sample identified on the COC as DAC-EIT-10-01-P (collected on November 4, 1997) was incorrectly changed on the COC to DAC-WIT-10-01-P. The correct field ID was verified by use of the latitude and longitude coordinates, and also through review of sampling logs. The hardcopy and electronic results from the laboratory use the correct field ID.

### **TECHNICAL ASSESSMENT**

The quality control (QC) requirements that were reviewed are listed below.

- Initial Calibration
- Continuing Calibration
- \* Blanks (Method)
- Surrogate Compounds
- \* Standard Reference Materials
- Laboratory Replicates
- \* Target Analyte List
- \* Method Detection Limits (MDL) and Reported Detection Limits

Those items marked with an asterisk (\*) did not meet all specified QC criteria and are discussed below. QC items not marked with an asterisk meet all QC criteria.

#### Blanks (Method)

Method blanks were analyzed at the required frequency. One or more PCB congeners were detected at low levels in several of the method blanks. The QAP acceptance criterion (no more than four target compound results with a concentration greater than four times the method detection limit can be present in a blank) was met for all method blanks.

To account for the potential effect of low-level contamination, validation action levels were established at 5 times the concentration detected in the method blank. All associated sample results that were less than the action levels were qualified as not detected (U-7) at the reported concentrations, thus elevating the stated detection limit.

#### Standard Reference Material

Thirty-eight replicate standard reference material (SRM) samples were prepared and analyzed, using National Institute of Standards and Technology (NIST) SRM 1944. Certified values were provided by NIST for the PCB congeners except congener numbers 77, 126, 157, 169, and 189.

For three certified compounds (PCB congeners 101, 128, and 153) all recovery values were greater than the upper control limit. Four recovery values were greater than the control limit for PCB congener 105. According to the laboratory's footnote, the elevated recoveries were due to co-elutions that could not be resolved by the HPLC/PDA analysis. As this indicates that a potential high bias exists for these compounds, all associated positive results for these congeners are estimated (J-10). All other recoveries for certified compounds were acceptable.

#### Method Detection Limits and Reported Detection Limits

The laboratory calculated method detection limits (MDL) according to Appendix B of 40 CFR, Part 136. For PCBs, the calculated MDL values were less than the target detection limit (4 ng/g) listed in the QAP. For PCTs, the calculated MDL value was greater than the target detection limit (4 ng/g) at 8.15 ng/g.

For analytes that were not detected, the laboratory did not report the MDL, but calculated a sample-specific reporting limit based upon the response of the lowest standard and the sample weight. This resulted in values reported at concentrations less than the MDL.

If the reported positive result was less than the calculated MDL, the result was qualified as J-11.

#### Target Analyte List

Seventy-seven results for individual PCB congeners were not reported due to analytical interferences with co-eluting PCTs. The laboratory reported a "NR" in the results field for these congeners.

### **III. DATA REVIEW OF TOC AND GRAIN SIZE**

Results from the analysis of 352 sediment samples for total organic carbon (TOC) and grain size were reviewed by EcoChem, Inc. The data summaries with related quality control results were provided by Applied Marine Sciences, League City, Texas.

#### **COMPLETENESS**

The laboratory followed the QAP requirements for QC sample frequency of analysis, acceptance criteria, and corrective action processes. All anomalies were discussed in the case narrative or in footnotes to the data. No data were rejected based on the validation process.

#### **CUSTODY**

Field chain-of-custody forms (COCs) were present and complete. All forms were signed and dated. No problems with sample receipt conditions were indicated on the field COCs, and all samples listed on the COCs were analyzed.

#### **TECHNICAL ASSESSMENT**

The quality control (QC) requirements that were reviewed are listed below.

- Technical Holding Times
- Blanks (Method)
- Calibration
- Standard Reference Material (SRM)
- \* Laboratory Replicates
- Reporting Limits

Those items marked with an asterisk (\*) did not meet all specified QC criteria and are discussed below. QC items not marked with an asterisk meet all QC criteria.

#### **Laboratory Replicates**

Laboratory replicate analyses were performed on a selected sample from each batch of analyses. Precision was within the specified 35% relative percent difference (RPD) control limit for the replicate analyses except for two sets of duplicates for gravel. The percent gravel in these samples were very low. (Results for Sample DAC-EST19-04 were 0.04% and 0.13% gravel, and for Sample DAC-EST12-09 were 0.02% and 0.05% gravel.) Thus, no qualifiers were assigned to the data.

## REFERENCES

- Environmental Conservation Division, Northwest Fisheries Science Center. 1998. Duwamish River Sediment Study Quality Assurance Project Plan. National Oceanic and Atmospheric Administration. Seattle, Washington. January, 1998.
- Environmental Conservation Division, Northwest Fisheries Science Center. 1997. Duwamish River Sediment Study Sampling and Analysis Plan. National Oceanic and Atmospheric Administration. Seattle, Washington. September, 1997.
- Krone, C. and P. Robisch. 1994. Standard Operating Procedures for Hylebos Sediments from Sampling and Analytical Methods of the National Status and Trends Program, National Benthic Descriptions of Elemental Analytical Methods, NOAA Technical Memorandum NOS ORCA 71, G.G. Lauenstein and A.Y. Cantillo, Editors, Silver Springs, Maryland, July 1993.
- Puget Sound Estuary Program. 1997. Recommended Protocols for Measuring Selected Environmental Variables in Puget Sound. Prepared for U.S. Environmental Protection Agency. April, 1997.
- Sloan, C. A., N. G. Adams, R. W. Pearce, D. W. Brown, and S-L. Chan. 1993. Northwest Fisheries Science Center Organic Analytical Procedures. National Oceanic and Atmospheric Administration/National Marine Fisheries Service and Northwest Fisheries Science Center. Seattle, Washington.
- Sweet, S. T., J. M. Wong, J. M. Brooks, and T. L. Wade. 1994. Sediment Grain Size Analyses for NOAA National Status and Trends Mussel Watch Project. Geochemical and Environmental Research Group, Texas A&M University.
- US Environmental Protection Agency. 1994. National Functional Guidelines for Organic Data Review. EPA-540/R94/012. Washington, D.C.

**Table 1**  
**SAMPLE LIST**

Field_ID	Collected	NMFS_ID	AMS_ID
DAC-CH01-01	10/20/97	117-697	1799
DAC-CH01-02	10/09/97	117-412	1715
DAC-CH01-03	10/09/97	117-643	1716
DAC-CH01-04	10/20/97	117-421	1798
DAC-CH02-01	10/09/97	117-427	1717
DAC-CH02-02-R	11/12/97	117-420	1665
DAC-CH02-03	10/09/97	117-428	1718
DAC-CH03-01	10/15/97	117-425	1755
DAC-CH03-02	10/15/97	117-424	1756
DAC-CH03-03	10/15/97	117-423	1757
DAC-CH03-04	10/15/97	117-422	1758
DAC-CH04-01	10/15/97	117-215	1754
DAC-CH04-02	10/10/97	117-214	1722
DAC-CH04-03	10/10/97	117-218	1723
DAC-CH04-04-R	11/13/97	117-310	1864
DAC-CH05-01	10/15/97	117-426	1753
DAC-CH05-02	10/20/97	117-442	1801
DAC-CH06-01	10/24/97	117-624	1829
DAC-CH06-02	10/15/97	117-619	1751
DAC-CH06-03	10/15/97	117-620	1752
DAC-CH07-01	10/16/97	117-622	1775
DAC-CH07-02	10/14/97	117-615	1744
DAC-CH07-03	10/14/97	117-618	1745
DAC-CH08-01	10/16/97	117-621	1764
DAC-CH08-02	10/16/97	117-629	1765
DAC-CH09-01	10/16/97	117-631	1777
DAC-CH09-02	10/16/97	117-630	1776
DAC-CH09-03	10/16/97	117-628	1763
DAC-CH10-01	10/16/97	117-632	1778
DAC-CH10-02	10/17/97	117-633	1783
DAC-CH11-01	10/17/97	117-636	1786
DAC-CH11-02	10/17/97	117-635	1785

Field\_ID = Identification assigned to the samples in the field.  
 NMFS\_ID = Identification assigned to the samples by the NMFS laboratory.  
 AMS\_ID = Identification assigned to the samples by the AMS Laboratory.

**Table 1  
(Continued)**

<b>Field_ID</b>	<b>Collected</b>	<b>NMFS_ID</b>	<b>AMS_ID</b>
DAC-CH11-03	10/17/97	117-650	1784
DAC-CH12-01-2	10/24/97	117-637	1828
DAC-CH12-02	10/17/97	117-646	1787
DAC-CH13-01	10/24/97	117-648	1827
DAC-CH13-02	10/17/97	117-645	1782
DAC-CH13-03	10/17/97	117-644	1781
DAC-EIT01-01	09/30/97	117-676	1654
DAC-EIT01-02	09/30/97	117-677	1655
DAC-EIT02-01	10/14/97	117-277	1733
DAC-EIT02-02	10/14/97	117-278	1734
DAC-EIT02-04	10/14/97	117-279	1735
DAC-EIT03-01	11/13/97	117-266	1985
DAC-EIT03-02	09/29/97	117-268	1624
DAC-EIT03-03	11/13/97	117-267	1871
DAC-EIT03-04	09/29/97	117-264	1625
DAC-EIT04-01	11/13/97	117-486	1872
DAC-EIT04-02	11/13/97	117-485	1873
DAC-EIT04-03	10/16/97	117-487	1769
DAC-EIT05-01	09/29/97	117-344	1626
DAC-EIT05-02	09/26/97	117-671	1616
DAC-EIT06-01	09/26/97	117-229	1617
DAC-EIT06-02	09/29/97	117-234	1627
DAC-EIT06-03	09/29/97	117-228	1628
DAC-EIT07-01	09/26/97	117-186	1618
DAC-EIT07-02-1	11/12/97	117-217	1859
DAC-EIT07-03	09/26/97	117-188	1619
DAC-EIT07-04	09/26/97	117-187	1620
DAC-EIT07-05-2	11/12/97	117-280	1858
DAC-EIT08-01-R	11/12/97	117-296	1852
DAC-EIT08-02	09/26/97	117-190	1622
DAC-EIT08-03	09/26/97	117-189	1623
DAC-EIT09-01	11/03/97	117-439	1834
DAC-EIT09-02	11/03/97	117-437	1833
DAC-EIT09-03	10/17/97	117-440	1779
DAC-EIT09-04	10/16/97	117-434	1774

**Table 1**  
**(Continued)**

<b>Field_ID</b>	<b>Collected</b>	<b>NMFS_ID</b>	<b>AMS_ID</b>
DAC-EIT10-01	11/04/97	117-459	1839
DAC-EIT10-02	10/17/97	117-462	1780
DAC-EIT11-01-2	11/12/97	117-473	1855
DAC-EIT11-02	09/19/97	117-479	1573
DAC-EIT11-03	09/19/97	117-478	1574
DAC-EIT12-01	09/19/97	117-508	1575
DAC-EIT12-02-5	11/12/97	117-505	1854
DAC-EIT13-01	09/18/97	117-516	1552
DAC-EIT13-02	09/18/97	117-512	1553
DAC-EIT13-03	09/18/97	117-513	1561
DAC-EIT14-01	09/18/97	117-532	1562
DAC-EIT14-02	09/19/97	117-529	1576
DAC-EITUPRVR01	09/30/97	117-297	1656
DAC-EITUPRVR02	09/30/97	117-299	1657
DAC-EST01-01	10/14/97	117-282	1741
DAC-EST01-02	10/14/97	117-283	1742
DAC-EST01-03	10/14/97	117-284	1743
DAC-EST01-04	10/15/97	117-292	1748
DAC-EST02-02	10/14/97	117-281	1740
DAC-EST02-03	10/15/97	117-285	1761
DAC-EST03-01-R	11/12/97	117-303	1842
DAC-EST03-02-1	10/23/97	117-286	1823
DAC-EST03-03-R	11/12/97	117-317	1843
DAC-EST03-04	10/14/97	117-271	1739
DAC-EST03-05-R	11/12/97	117-316	1844
DAC-EST04-01	09/30/97	117-270	1644
DAC-EST04-02	10/08/97	117-265	1711
DAC-EST04-03	09/30/97	117-272	1645
DAC-EST04-04	09/30/97	117-269	1646
DAC-EST04-05-R	11/12/97	117-312	1845
DAC-EST05-01	09/30/97	117-488	1647
DAC-EST05-02-R	11/12/97	117-305	1846
DAC-EST06-01	09/26/97	117-493	1609
DAC-EST06-02	09/26/97	117-492	1610
DAC-EST06-03	09/29/97	117-491	1629



**Table 1  
(Continued)**

<b>Field_ID</b>	<b>Collected</b>	<b>NMFS_ID</b>	<b>AMS_ID</b>
DAC-EST06-04	10/21/97	117-490	1807
DAC-EST06-05-R	11/12/97	117-313	1847
DAC-EST06-06	09/30/97	117-489	1641
DAC-EST06-07	09/29/97	117-238	1631
DAC-EST06-08	09/30/97	117-311	1642
DAC-EST07-01	09/29/97	117-239	1632
DAC-EST07-02	09/29/97	117-246	1633
DAC-EST07-03	09/29/97	117-240	1634
DAC-EST07-04	09/29/97	117-242	1635
DAC-EST07-05	09/29/97	117-245	1636
DAC-EST07-06	10/21/97	117-247	1806
DAC-EST07-07-R	11/12/97	117-308	1848
DAC-EST07-08	09/26/97	117-244	1612
DAC-EST08-01	10/15/97	117-668	1760
DAC-EST08-02	10/15/97	117-669	1762
DAC-EST08-03	09/26/97	117-670	1613
DAC-EST09-01	09/25/97	117-233	1606
DAC-EST09-02	10/24/97	117-227	1831
DAC-EST09-03	09/25/97	117-232	1607
DAC-EST09-04	09/25/97	117-226	1608
DAC-EST09-05	09/26/97	117-231	1614
DAC-EST09-06	09/26/97	117-243	1615
DAC-EST10-01	09/25/97	117-225	1604
DAC-EST10-02-R	11/12/97	117-306	1849
DAC-EST11-01-R	11/13/97	117-307	1865
DAC-EST11-02	10/21/97	117-230	1802
DAC-EST11-03	09/24/97	117-181	1594
DAC-EST11-04	09/24/97	117-174	1595
DAC-EST11-05	09/24/97	117-173	1596
DAC-EST11-06	09/24/97	117-178	1597
DAC-EST11-07	09/24/97	117-176	1598
DAC-EST11-08	09/24/97	117-175	1599
DAC-EST11-09	09/24/97	117-177	1600
DAC-EST11-10	09/25/97	117-179	1601
DAC-EST11-11-R	11/13/97	117-304	1868

**Table 1  
(Continued)**

<b>Field_ID</b>	<b>Collected</b>	<b>NMFS_ID</b>	<b>AMS_ID</b>
DAC-EST11-12	09/25/97	117-180	1603
DAC-EST12-01	09/22/97	117-191	1577
DAC-EST12-02	09/22/97	117-192	1578
DAC-EST12-03	09/22/97	117-193	1579
DAC-EST12-04	09/22/97	117-205	1580
DAC-EST12-05	09/22/97	117-201	1581
DAC-EST12-06	09/30/97	117-204	1640
DAC-EST12-07-1	10/07/97	117-216	1704
DAC-EST12-08-1	09/23/97	117-208	1584
DAC-EST12-09	09/22/97	117-199	1582
DAC-EST12-10	09/22/97	117-200	1583
DAC-EST13-01	10/22/97	117-435	1813
DAC-EST13-02	10/22/97	117-438	1814
DAC-EST13-03	10/07/97	117-436	1705
DAC-EST13-04	10/06/97	117-433	1700
DAC-EST13-05	10/06/97	117-452	1701
DAC-EST13-06	10/07/97	117-449	1706
DAC-EST14-01-R	11/13/97	117-455	1861
DAC-EST14-02	10/20/97	117-453	1794
DAC-EST14-03-1	10/22/97	117-447	1815
DAC-EST14-04	10/20/97	117-448	1795
DAC-EST14-05	10/20/97	117-454	1796
DAC-EST15-01	10/10/97	117-451	1724
DAC-EST15-02	10/17/97	117-446	1788
DAC-EST15-03	10/17/97	117-450	1789
DAC-EST16-01	10/16/97	117-464	1767
DAC-EST16-02	10/22/97	117-461	1816
DAC-EST16-03	10/16/97	117-463	1768
DAC-EST16-04	10/10/97	117-467	1721
DAC-EST16-05	10/14/97	117-465	1738
DAC-EST17-01	10/14/97	117-466	1737
DAC-EST17-02-2	10/22/97	117-460	1817
DAC-EST18-01	10/07/97	117-468	1707
DAC-EST18-02-R	11/13/97	117-472	1860
DAC-EST18-03	10/07/97	117-475	1709

**Table 1  
(Continued)**

<b>Field_ID</b>	<b>Collected</b>	<b>NMFS_ID</b>	<b>AMS_ID</b>
DAC-EST18-04	10/06/97	117-476	1702
DAC-EST19-01	09/17/97	117-480	1548
DAC-EST19-02	09/17/97	117-481	1549
DAC-EST19-03-1	10/23/97	117-474	1820
DAC-EST19-04	09/16/97	117-501	1542
DAC-EST19-05	09/19/97	117-477	1571
DAC-EST19-06	10/07/97	117-506	1710
DAC-EST20-01	09/17/97	117-498	1545
DAC-EST20-02	09/17/97	117-499	1546
DAC-EST20-03	09/17/97	117-502	1547
DAC-EST20-04	10/22/97	117-504	1819
DAC-EST20-05	10/14/97	117-500	1736
DAC-EST20-06	09/17/97	117-519	1544
DAC-EST21-01	10/14/97	117-511	1732
DAC-EST21-02	09/16/97	117-520	1543
DAC-EST21-03	09/17/97	117-517	1550
DAC-EST21-04	09/17/97	117-518	1551
DAC-EST22-01	09/18/97	117-530	1563
DAC-EST22-02	09/18/97	117-531	1564
DAC-EST22-03	09/18/97	117-533	1565
DAC-EST22-04	10/14/97	117-525	1731
DAC-EST23-01	10/24/97	117-524	1826
DAC-EST23-02	10/06/97	117-528	1703
DAC-EST23-03	09/19/97	117-541	1566
DAC-EST23-04	09/19/97	117-542	1567
DAC-EST23-05	09/19/97	117-543	1568
DAC-EST23-06	09/19/97	117-700	1569
DAC-ESTUPRVR01	10/15/97	117-298	1749
DAC-WEST01	09/24/97	117-220	1591
DAC-WEST02	09/24/97	117-212	1592
DAC-WEST03	09/23/97	117-203	1585
DAC-WEST04	09/23/97	117-206	1586
DAC-WEST05	09/23/97	117-207	1587
DAC-WEST06	09/23/97	117-416	1588
DAC-WEST07	09/23/97	117-213	1589

**Table 1  
(Continued)**

<b>Field_ID</b>	<b>Collected</b>	<b>NMFS_ID</b>	<b>AMS_ID</b>
DAC-WEST08	09/23/97	117-219	1590
DAC-WIT01-01	09/30/97	117-290	1649
DAC-WIT01-02	09/30/97	117-291	1650
DAC-WIT01-03	09/30/97	117-293	1651
DAC-WIT01-04	09/30/97	117-294	1652
DAC-WIT01-05	09/30/97	117-295	1653
DAC-WIT02-01	10/01/97	117-322	1666
DAC-WIT02-02	10/02/97	117-319	1673
DAC-WIT03-01	10/01/97	117-321	1667
DAC-WIT03-02	10/01/97	117-320	1668
DAC-WIT03-03	09/29/97	117-323	1637
DAC-WIT03-04	09/29/97	117-324	1638
DAC-WIT03-05	10/17/97	117-318	1792
DAC-WIT03-06	09/29/97	117-338	1639
DAC-WIT04-01	11/13/97	117-672	1870
DAC-WIT04-02	10/02/97	117-673	1674
DAC-WIT05-01	10/01/97	117-376	1669
DAC-WIT05-02	10/01/97	117-375	1670
DAC-WIT05-03	10/01/97	117-374	1671
DAC-WIT05-04	10/01/97	117-377	1672
DAC-WIT06-01	10/16/97	117-337	1770
DAC-WIT06-02	10/16/97	117-333	1771
DAC-WIT06-03	10/02/97	117-330	1675
DAC-WIT07-01	10/16/97	117-698	1772
DAC-WIT07-02	10/16/97	117-335	1773
DAC-WIT07-03	10/14/97	117-331	1747
DAC-WIT08-01	11/04/97	117-402	1835
DAC-WIT08-02	11/04/97	117-400	1836
DAC-WIT08-03	10/03/97	117-395	1693
DAC-WIT08-04	11/04/97	117-399	1837
DAC-WIT08-05	11/13/97	117-394	1869
DAC-WIT08-06	11/04/97	117-397	1838
DAC-WIT09-01-R5	11/12/97	117-611	1857
DAC-WIT09-02	10/03/97	117-602	1694
DAC-WIT10-01	11/12/97	117-608	1856

**Table 1  
(Continued)**

<b>Field_ID</b>	<b>Collected</b>	<b>NMFS_ID</b>	<b>AMS_ID</b>
DAC-WIT10-02	10/17/97	117-605	1791
DAC-WIT11-01	10/03/97	117-596	1696
DAC-WIT11-02	10/03/97	117-595	1697
DAC-WIT12-01-R	11/12/97	117-576	1853
DAC-WIT12-02	09/16/97	117-566	1532
DAC-WIT12-03	09/15/97	117-565	1523
DAC-WIT12-04	09/15/97	117-572	1524
DAC-WIT12-05	09/15/97	117-579	1525
DAC-WIT12-06	09/15/97	117-580	1526
DAC-WIT12-07	09/16/97	117-584	1533
DAC-WIT12-08	09/16/97	117-583	1534
DAC-WIT13-01	09/16/97	117-559	1535
DAC-WIT13-02	09/18/97	117-553	1559
DAC-WIT13-03	09/16/97	117-558	1536
DAC-WIT13-04	09/16/97	117-557	1537
DAC-WIT13-05	09/18/97	117-552	1560
DAC-WIT13-06	09/19/97	117-551	1572
DAC-WIT14-01	10/17/97	117-537	1790
DAC-WIT14-02	10/14/97	117-538	1746
DAC-WST01-01	10/08/97	117-674	1712
DAC-WST01-02	10/20/97	117-675	1797
DAC-WST02-01	10/01/97	117-373	1658
DAC-WST02-02	10/23/97	117-368	1824
DAC-WST03-01	10/21/97	117-370	1808
DAC-WST03-02	10/21/97	117-369	1809
DAC-WST03-03	10/21/97	117-371	1810
DAC-WST04-01	10/01/97	117-381	1659
DAC-WST04-02	10/01/97	117-386	1660
DAC-WST04-03-R	11/13/97	117-389	1867
DAC-WST05-01-R	11/13/97	117-384	1866
DAC-WST05-02-1	10/23/97	117-382	1825
DAC-WST06-01	10/20/97	117-383	1800
DAC-WST06-02	10/01/97	117-385	1663
DAC-WST07-01-R	11/12/97	117-334	1851
DAC-WST07-02	10/01/97	117-332	1664

**Table 1  
(Continued)**

<b>Field_ID</b>	<b>Collected</b>	<b>NMFS_ID</b>	<b>AMS_ID</b>
DAC-WST07-03	10/15/97	117-336	1759
DAC-WST08-01	10/02/97	117-349	1677
DAC-WST08-02	10/02/97	117-345	1678
DAC-WST08-03	10/02/97	117-351	1679
DAC-WST08-04	10/02/97	117-348	1680
DAC-WST09-01	10/21/97	117-390	1804
DAC-WST09-02	10/21/97	117-695	1803
DAC-WST10-01	10/03/97	117-398	1684
DAC-WST10-02	10/03/97	117-396	1685
DAC-WST10-03-R	11/12/97	117-408	1841
DAC-WST10-04	10/03/97	117-401	1687
DAC-WST10-05	10/03/97	117-403	1688
DAC-WST10-06	10/03/97	117-641	1689
DAC-WST10-07	10/03/97	117-414	1690
DAC-WST10-08	10/03/97	117-642	1691
DAC-WST11-01-R2	11/13/97	117-407	1863
DAC-WST11-02	10/24/97	117-649	1830
DAC-WST11-03-1	10/24/97	117-409	1832
DAC-WST12-01	10/22/97	117-607	1811
DAC-WST12-02	10/22/97	117-623	1812
DAC-WST13-01	10/10/97	117-604	1726
DAC-WST13-02-R	11/13/97	117-610	1862
DAC-WST13-03	10/21/97	117-606	1805
DAC-WST14-01-2	10/23/97	117-589	1822
DAC-WST14-02	10/10/97	117-603	1725
DAC-WST15-01	10/09/97	117-593	1713
DAC-WST15-02	10/09/97	117-592	1714
DAC-WST15-03	10/06/97	117-594	1698
DAC-WST16-01	10/16/97	117-342	1766
DAC-WST16-02-1	10/23/97	117-347	1821
DAC-WST17-01	10/22/97	117-343	1818
DAC-WST17-02	10/06/97	117-350	1699
DAC-WST18-01	09/16/97	117-582	1539
DAC-WST18-02	09/16/97	117-581	1540
DAC-WST18-03	09/16/97	117-597	1541

**Table 1**  
**(Continued)**

<b>Field_ID</b>	<b>Collected</b>	<b>NMFS_ID</b>	<b>AMS_ID</b>
DAC-WST18-04	10/10/97	117-591	1720
DAC-WST18-05	10/10/97	117-590	1728
DAC-WST19-01-R	11/12/97	117-563	1840
DAC-WST19-02	09/18/97	117-554	1555
DAC-WST19-03	09/15/97	117-570	1527
DAC-WST19-04	09/15/97	117-571	1528
DAC-WST19-05	09/15/97	117-569	1529
DAC-WST19-06	09/18/97	117-564	1556
DAC-WST20-01	09/15/97	117-585	1530
DAC-WST20-02	09/19/97	117-577	1570
DAC-WST20-03	09/16/97	117-578	1538
DAC-WST21-01	09/18/97	117-545	1557
DAC-WST21-02	09/18/97	117-546	1558
DAC-WST21-03	10/15/97	117-550	1750
DAC-WST22-01	10/14/97	117-540	1729
DAC-WST22-02	10/14/97	117-539	1730

**Table 2**  
**DATA VALIDATION QUALIFIER CODES**

**Validation Qualifiers**

U	Analyte concentration is not significantly above the associated blank result. The result is judged to be the detection limit.
R	Unreliable result. Data should not be used.
J	Reported concentration may not be accurate or precise, as judged by associated calibration and/or reference material results
UJ	Not detected. Detection limit may be inaccurate or imprecise, as judged by the associated quality control results.

**Reason Codes**

7	Analyte was determined "not detected" due to method blank results - Action levels were established at 5 times the concentration detected in the associated method blank. Congener results that were less than the action level were qualified as not detected (U-7) at the reported concentrations.
10	Estimated value due to Standard Reference material (SRM) results - An SRM was analyzed with each batch of samples. If the SRM results did not meet the quality control criteria specified in the QAPP, the associated sample results were qualified.
11	Estimated value because the reported result is less than the calculated Method Detection Limit (MDL). MDLs were established based on procedures described in 40CFR Part 136 Appendix B. If the analyst reported a positive result less than this limit, the result was reported and estimated.



Table C-1	
SAMPLES COLLECTED WITHIN THE INTENDED SUB-STRATA BUT OUTSIDE OF THE TARGETED SAMPLING SEGMENT WITHIN THE SUB-STRATA <sup>(1)</sup>	
Sample ID	Sampling Segment
DAC-EIT04-01	DAC-EIT04-02
DAC-EIT07-05-2	DAC-EIT07-04
DAC-EIT08-02	DAC-EIT08-01
DAC-EIT12-02-05	DAC-EIT12-01
DAC-EST02-02	DAC-EST02-03
DAC-EST03-04	DAC-EST03-03
DAC-EST04-04	DAC-EST04-05
DAC-EST06-07	DAC-EST06-08
DAC-EST06-08	DAC-EST06-07
DAC-EST07-03	DAC-EST07-04
DAC-EST09-01	DAC-EST09-02
DAC-EST11-02	DAC-EST11-03
DAC-EST11-03	DAC-EST11-04
DAC-EST11-04	DAC-EST11-05
DAC-EST11-05	DAC-EST11-07
DAC-EST11-06	DAC-EST11-08
DAC-EST11-07	DAC-EST11-09
DAC-EST11-08	DAC-EST11-10
DAC-EST12-05	DAC-EST12-04
DAC-EST12-06	DAC-EST12-05
DAC-EST12-08-01	DAC-EST12-09
DAC-EST12-09	DAC-EST12-10
DAC-EST17-02-02	DAC-EST17-01
DAC-EST19-06	DAC-EST19-05
DAC-EST20-06	DAC-EST20-04
DAC-WIT06-06	DAC-WIT06-05
DAC-WIT12-05	DAC-WIT12-04
DAC-WIT13-04	DAC-WIT13-05
DAC-WIT13-05	DAC-WIT13-06
DAC-WST08-02	DAC-WST08-03
DAC-WST10-02	DAC-WST10-03
DAC-WST10-04	DAC-WST10-05

(1) Each sub-stratum was divided into equally weighted areas (sampling segments) for randomly generated sample locations

Of the 10 percent of samples in a nearby sampling segment but within the same targeted sub-stratum, some still result in one sample per sampling segment (e.g., a series of sampling locations that is shifted one sampling segment over). That subset of samples in nearby sampling segments will still meet study design objectives for sampling locations. In addition, of the 15 percent of samples collected outside the intended sampling segments, some are only marginally outside of the targeted sampling segments (e.g., within 20 feet).

Table C-2	
SAMPLES COLLECTED OUTSIDE OF THE TARGETED SUB-STRATA	
Sample ID	Sampling Segment
DAC-EIT01-01	DAC-EST01-04
DAC-EIT01-02	DAC-EST01-04
DAC-EIT03-03	DAC-EST04-02
DAC-EIT12-01	DAC-EST19-01
DAC-EIT13-01	DAC-EST21-01
DAC-EITUPRV01	DAC-ESTUPRV01
DAC-EST04-02	DAC-CH01-03 or DAC-CH01-04 *
DAC-EST09-04	DAC-EIT06-03
DAC-EST11-10	DAC-CH03-03
DAC-EST11-12	DAC-EST10-01 or DAC-CH03-04 *
DAC-WIT01-05	DAC-EST01-04
DAC-WIT04-01	DAC-WST02-01
DAC-WST11-03-1	DAC-CH04-01
DAC-WST16-01	DAC-CH08-02
* Sample was collected at the boundary between the two sampling segments listed.	

# **DATA VALIDATION REPORT DUWAMISH RIVER SEDIMENT STUDY**

## **I. INTRODUCTION & SUMMARY**

This data validation report summarizes results from a review of analytical data for 328 sediment samples collected by the Environmental Conservation Division of the Northwest Fisheries Science Center (ECD-NFSC) in the lower Duwamish River near Seattle, Washington. Sediment samples were collected between September and November of 1997. Analyses for total polychlorinated biphenyls (PCBs), 15 PCB congeners and total polychlorinated terphenyls (PCTs) were performed by the ECD-NFSC laboratory (Seattle, Washington). Analyses for total organic carbon and grain size were performed by Applied Marine Sciences, Inc. (League City, Texas). A list of samples reviewed is provided in **Table 1**.

### ***BASIS FOR DATA REVIEW***

Data packages received from the laboratories consisted of a laboratory case narrative, sample results, and associated quality control (QC) information. Data were reviewed by EcoChem, Inc. using project and method-specific criteria as specified in the Quality Assurance Plan (ECD-NFSC, 1998) and general guidelines as presented in US EPA Functional Guidelines (US EPA, 1994). Results which did not meet the project criteria were qualified using the qualifier codes listed in **Table 2**.

### ***OVERALL ASSESSMENT***

On the basis of this evaluation, the results from the analyses performed by the laboratories are acceptable for use. The laboratories followed the analytical methodologies as specified in the project QAP and the laboratory analytical procedures. A total of 9,574 analytical results were reported by the laboratories. No data points were rejected. The laboratory was unable to quantify 77 PCB congener results. Thus, the data set is over 99% complete.

Qualifications to the data added during the data validation process include:

- 196 selected PCB congener results were qualified as "non-detected" (U-7) due to the presence of the PCB congeners in the associated blanks
- 878 PCB congener results were qualified as estimated (J-10) due to a potential high bias from the presence of co-eluting compounds
- 139 results were qualified as estimated (J-11) because the value was less than the calculated method detection limit
- One sample result was qualified both J-10, and J-11, as co-eluting compounds were suspected and the reported value was less than the calculated detection limit.